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CENTRAL INTELLIGENCE AGENCY

# INFORMATION REPORT

COUNTRY USSR

SUBJECT Water Supply (Hydraulic Improvements)

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THIS IS UNEVALUATED INFORMATION

1. The water supply for agriculture and for the rural population in Imperial (Tsarist) Russia was very unsatisfactory. In the southern and southeastern areas it was so bad that there were frequent crop failures and epidemics of sickness among the population. Sometimes conflagrations destroyed entire villages because there was no water for fire fighting.

2. The USSR authorities actually gave some attention to the water supply for the agricultural population, but for a long time this attention was limited to good wishes and general projects in the Gosplan [State Planning Commission].

3. A series of publications and other material issued by the agricultural section of the Gosplan provides the possibility of understanding all the fundamentals which formed the basis for the plans for improvements, as well as their basic principles. The following main considerations were to be observed in all plans for agricultural improvements:

A. Systematic computation of the needs of agricultural improvements in the various zones and the possibilities - natural, technical and economic for their achievement.

B. A scheme for consistent realization of the first systematic plan.

SEE LAST PAGE FOR SUBJECT AREA

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4. In order to work out such a plan it was necessary to establish first the basic principles to guide the creators of the plan. Such principles were:

A. Greater productivity of agriculture in the USSR. This principle must determine the character of improvements and their need by individual zones.

B. The creation of an organization to assist agricultural economy on the territories of the USSR, based on considerations of a strategic character. This principle means consistency and intensiveness in the carrying out of improvements in individual zones.

5. The need for improvements and their feasibility were determined by three groups of leading factors:

A. Natural: climate, hydrological conditions and character of soil;
B. General economic: land, rural economy and economic conditions;
C. Strategic considerations.

6. In the territory of European USSR these factors were divided unequally, varying according to the separate zones. These differences, especially those pertaining to nature, follow definite laws. The changes in nature follow the direction from the northwest to the southeast of the USSR. The factors of agricultural economy and economics change in the direction from the southwest to the northeast. And, finally, strategic factors change from north to south.

7. On the basis of the characteristics noted above, all the territory of the European USSR fell into definite meliorative zones. The improvements needed in each zone varied in kind and form, intensity of technics, and economics. The state plan for meliorations in the agricultural economy were to be drawn up according to zones. (See Enclosure A). The basic principles of plans for improvements on the one hand, and the natural and economic conditions of the margin areas on the other, were to determine the main types of improvements in various zones, and the outlines (See Enclosures C, D, and E) of various zones serve as a guide. The facts shown thereon give a picture of the distribution of waste lands in European USSR, and prove its conformity with the directions of the climatic factors.

8. The main reason for the existence of waste lands lies in the absence of regular natural increases and decreases in moisture in the soil, as needed by agriculture. The regulation of moisture in the soil must be taken as the basic factor in the irrigation improvements on the territroy of European USSR. The need of soils and vegetation for moisture is tied to the intensity of evaporation caused by climatic conditions in each zone and, consequently, by a proportionate shortage of humidity in the air and by the temperature of the air.

9. If the rate of evaporation in the upper soils and vegetation is represented by the symbol E, the increase of moisture by P, and the average coefficient of drainage for a zone by "e", the average coefficient of natural increases and decreases of moisture is indicated by the formula $\frac{e \times P}{E}$. On the basis of the above formula, Professor A. Kostyakov (Director of the Research Institute of Melioratization and author of many technical books) figured out the average coefficients and classified them in a table (See Enclosure B).

10. The entire territory of European USSR can be divided into the following zones on the basis of the formula:

A. The zone where the ratio $\frac{e \times P}{E}$ is always over 1.0 which indicates this zone has the necessary amount of moisture;

B. The zone where the ratio $\frac{e \times P}{E}$ is between 0.5 and 1.25, according to season and location, which is a zone of inconstant moisture.

C. The zone where the ratio $\frac{e \times P}{E}$ is always under 1.0, which indicates this zone is one of insufficient moisture, or arid.



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11. If the coefficients for each guberniya obtained from the formula are traced on a chart, the entire territory of European USSR can be divided into three large zones:

A. The north northwest zone, having sufficient moisture, including the following provinces: Arkhangel'skaya, Vologodskya, Olentskaya, Leningradskaya, Novgorodskaya, Pskovskaya, Minskaya, Mogilevskaya, Smolenskaya, Tverskaya, Yaroslavskaya, Kostromskaya, and parts of Kaluzhskaya and Vladimirskaya.

B. The central zone, having inconsistent moisture, includes the following provinces: Volynskaya, Podol'skaya, Kievskaya, Chernigovskaya, Poltavskaya, Orlovskaya, Kurskaya, Kharkovskaya, Tul'skaya, Ryazanskaya, Nizhegorodskaya, Tambovskaya, Penzenskaya, Kazanskaya, Vyatskaya, Permskaya, Ugimskaya, and part of Moskovskaya, Vladimirskaya and Orenburgskaya.

C. The south southeastern zone, having insufficient moisture, includes the following provinces: Saratovskaya, Astrakhanskaya, Donskaya oblast, Ekaterinoslavskaya, Tavricheskaya, Khersonskaya, Bessarabskaya, Ural'skaya, and Samarskaya.

-end-

Enclosures: (A) Outline of meliorative zones.
(B) Average coefficient of natural increases and decreases of moisture.
(C) Approximate Area of unproductive lands by separate provinces in thousand desyatinas (2.70 acres).
(D) Approximate Areas of sands in thousand desyatinas (2.70 acres).
(E) Exact lengths of waterways in versts per 1,000 square versts of area by separate provinces.

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ENCLOSURE A

Outline of Meliorative Zones

| Meliorative zone | The zones comprise of the provinces below: | Main forms of improvements |
|---|---|---|
| Northern | Arkhangel'skaya<br>Vologodskaya<br>Olonetskaya | Extensive drainage of fields and forests. Regulation and channelling of rivers. |
| Northwestern | Leningradskaya<br>Novgorodskaya<br>Pskovskaya<br>Tverskaya | Partial drainage of forests and fields. Drainage of fields for intensive crops. |
| Western | Mogilevskaya<br>Minskaya<br>Vitebskaya | More extensive drainage of fields and forests by open ditches. Drainage of meadows and fields prepared for intensive crops. |
| Southwestern | Kievskaya<br>Podol'skaya<br>Poltavskaya<br>Chernigovskaya<br>Volynskaya | Intensive drainage of fields and meadows, using water-lifting machinery for irrigation of fields and gardens. |
| Central agricultural | Kurskaya<br>Kharkovskaya<br>Orlovskaya<br>Tambovskaya<br>Voronezhskaya | Irrigation of fields by canals. Irrigation of meadows by flooding. Reinforcement of banks of gullies. |
| Central industrial | Moskovskaya<br>Tverskaya<br>Vladimirskaya<br>Ryazanskaya<br>Tul'skaya<br>Kaluzhskaya<br>Nizhegorodskaya<br>Kostromskaya | Drainage of forests. Intensive drainage of meadows. Reinforcement of banks of gullies. |
| Northeastern | Permskaya<br>Vyatskaya<br>Ufimskaya<br>Kazanskaya<br>Orenburgskaya | Extensive drainage of meadows and forests. Flooding. |
| Southeastern | Ul'yanovskaya<br>Simbirskaya<br>Saratovskaya<br>Samarskaya<br>Astrakhanskaya<br>Ural'skaya<br>Orenburgskaya | Various types of drainage and reinforcement of banks of gullies. |
| Southern | Khersonskaya<br>Ekaterinoslavskaya<br>Tavricheskaya<br>Donskaya oblast<br>Stavropol'skaya | Various types of drainage and reinforcement of banks of gullies. |



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ENCLOSURE B

Average coefficient of natural increases and decreases of moisture.

| Province | Coefficient | Province | Coefficient |
|---|---|---|---|
| Arkhangel'skaya | 1.68 | Tavricheskaya | 0.65 |
| Vologodskaya | 1.51 | Khersonskaya | 0.50 |
| Olonetskaya | 1.60 | Bessarabskaya | 0.60 |
| Leningradskaya | 1.67 | Ural'skaya | 0.27 |
| Novgorodskaya | 2.00 | Kurskaya | 0.80 |
| Pskovskaya | 1.77 | Kharkovskaya | 0.82 |
| Tverskaya | 1.62 | Voronezhskaya | 0.85 |
| Vitebskaya | 1.81 | Tul'skaya | 1.05 |
| Minskaya | 1.55 | Moskovskaya | 1.35 |
| Mogilevskaya | 1.45 | Vladimirskaya | 1.40 |
| Smolenskaya | 1.55 | Ryazanskaya | 1.01 |
| Volynskaya | 1.23 | Kostromskaya | 1.55 |
| Podol'skaya | 0.98 | Nizhegorodskaya | 1.10 |
| Kievskaya | 0.88 | Tambovskaya | 0.93 |
| Chernigovskaya | 1.35 | Penzenskaya | 0.93 |
| Poltavskaya | 0.80 | Kazanskaya | 0.96 |
| Orlovskaya | 1.20 | Vyatskaya | 1.10 |
| Saratovskaya | 0.60 | Permskaya | 1.20 |
| Astrakhanskaya | 0.24 | Ugimskaya | 1.19 |
| Donskaya oblast | 0.51 | Orenburgskaya | 0.56 |
| Ekaterinoslavskaya | 0.68 | Samarskaya | 0.48 |



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ENCLOSURE C

Approximate Area of Unproductive Lands by Separate Provinces in Thousand Desyatinas (2.70 Acres).

| Province | Area Absolute | Area Percentage | Province | Area Absolute | Area Percentage |
|---|---|---|---|---|---|
| Arkhangel'skaya | 38,948 | 54.3 | Kazanskaya | 302 | 5.3 |
| Vologodskaya | 1,911 | 5.3 | Vyatskaya [Vyatka] | 450 | 3.0 |
| Olonetskaya | 1,465 | 12.2 | Permskaya | 2,077 | 7.0 |
| Leningradskaya | 625 | 15.5 | Ufimskaya | 855 | 8.0 |
| Pskovskaya | 616 | 16.7 | Orenburgskaya | 1,895 | 11.3 |
| Novgorodskaya | 1,944 | 19.3 | Samarskaya | 1,515 | 11.0 |
| Tverskaya | 677 | 12.1 | Astrakhanskaya | 2,923 | 25.0 |
| Yaroslavskaya | 245 | 7.8 | Kharkovskaya | 330 | 6.8 |
| Kostromskaya | 596 | 7.9 | Poltavskaya | 162 | 3.8 |
| Vladimirskaya | 327 | 7.9 | Chernigovskaya | 343 | 7.8 |
| Moskovskaya [Moscow] | 166 | 5.6 | Kievskaya | 268 | 5.9 |
| Kaluzhskaya [Kaluga] | 117 | 4.2 | Volynskaya | 710 | 11.5 |
| Tul'skaya [Tula] | 80 | 2.9 | Podol'skaya | 180 | 4.9 |
| Ryazanskaya | 252 | 6.7 | Bessarabskaya | 162 | 4.1 |
| Orlovskaya [Orel] | 197 | 4.8 | Khersonskaya | 279 | 4.3 |
| Kurskaya | 145 | 3.5 | Tavricheskaya | 453 | 8.3 |
| Voronezhskaya | 344 | 5.9 | Ekaterinoslavskaya | 351 | 6.1 |
| Tamboskaya | 291 | 4.9 | Donskaya Oblast | 1,433 | 10.0 |
| Penzenskaya [Penza] | -- | 10.0 | Vitebskaya | 680 | 17.8 |
| Saratovskaya | 694 | 10.2 | Smolenskaya | 446 | 9.3 |
| Simbirskaya | 210 | 4.9 | Mogilevskaya | 656 | 15.6 |
| Nizhegorodskaya | 336 | 7.4 | Minskaya | 1,690 | 21.9 |

Note: In reality the unproductive land areas were much larger because test surveys (1938) of certain provinces such as Moscow proved that the approximate figures of unproductive lands were greatly underestimated.



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ENCLOSURE D

Approximate Areas of Sands in Thousand Desyatinas (2.70 Acres).

| Province | Area |
|---|---|
| Astrakhanskaya | 4,000 |
| Donskaya oblast | 631 |
| Terskaya oblast | 525 |
| Kharkovskaya | 114 |
| Poltavskaya | 83 |
| Tavricheskaya | 81 |
| Chernigovskaya | 70 |
| Voronezhskaya | 65 |
| Stavropol'skaya | 50 |
| Ekaterinoslavskaya | 42 |
| Saratovskaya | 39 |
| Samarskaya | 39 |
| Kievskaya | 33 |
| Vladimirskaya | 19 |
| Minskaya | 19 |
| Volynskaya | 17 |
| Tambovskaya | 16 |
| Mogilevskaya | 15 |
| Khersonskaya | 12 |
| Kurskaya | 12 |
| Simburskaya | 12 |
| Vitebskaya | 7 |
| Orlovskaya | 6 |
| Smolenskaya | 3 |
| Ryazanskaya | 3 |
| Penzenskaya | 2 |



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ENCLOSURE E

Exact Lengths of Waterways in Versts (1.067 KM) per 1,000 sqare versts of area by separate provinces

| Province | Length versts | Province | Length versts |
|---|---|---|---|
| Leningradskaya | 136.4 | Ul'yanovskaya | 28.0 |
| Novgorodskaya | 115.2 | Vladimirskaya | 27.8 |
| Pskovskaya | 102.1 | Ryazanskaya | 25.6 |
| Olonetskaya | 100.3 | Orlovskaya | 25.1 |
| Minskaya | 91.7 | Kievskaya | 23.5 |
| Vitebskaya | 91.3 | Penzenskaya | 21.3 |
| Kaluzhskaya | 82.0 | Orenburgskaya | 19.0 |
| Tverskaya | 82.0 | Tambovskaya | 18.3 |
| Kostromskaya | 80.0 | Khersonskaya | 15.9 |
| Mogilevskaya | 62.4 | Voronezhskaya | 15.0 |
| Smolenskaya | 59.9 | Kurskaya | 14.4 |
| Yaroslavskaya | 53.0 | Saratovskaya | 13.2 |
| Vyatskaya | 52.3 | Donskaya oblast | 12.6 |
| Permskaya | 42.2 | Samarskaya | 12.3 |
| Moskovskaya | 40.2 | Podol'skaya | 11.8 |
| Ufimskaya | 40.0 | Ekaterinoslavskaya | 10.6 |
| Chernigovskaya | 38.1 | Astrakhanskaya | 10.0 |
| Nizhegorodskaya | 37.4 | Poltavskaya | 8.7 |
| Arkhangel'skaya | 35.9 | Kharkovskaya | 5.3 |
| Volynskaya | 35.8 | Tavricheskaya | 3.7 |
| Kazanskaya | 35.5 | | |



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